CASE REPORT

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Deep vein thrombosis after arthroscopic anterior cruciate ligament reconstruction in a patient with primary thrombocytopenia

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Deep vein thrombosis is a rare complication after arthroscopic anterior cruciate ligament reconstruction. We present a patient with primary thrombocytopenia who had deep vein thrombosis after arthroscopic anterior cruciate ligament reconstruction. The patient recovered well at a 2-year follow-up. The purpose of this study was to enhance the awareness on venous thrombosis, a rare complication after arthroscopic anterior cruciate ligament reconstruction.

Key words: Deep vein thrombosis; anterior cruciate ligament reconstruction; thrombocytopenia.

Deep vein thrombosis (DVT) is a well-recognized but relatively rare complication after arthroscopic anterior cruciate ligament (ACL) reconstruction. Cullison et al. reported a single case of asymptomatic DVT out of 67 patients less than 40 years, with an incidence rate of 1.5%.[1] A recent study revealed an DVT incidence of 1.78% after ACL reconstruction.[2]

Most of the thromboembolic complications after ACL reconstruction occurred in normal patients. The incidence of postoperative venous thrombosis is supposed to be low in a patient with thrombocytopenia, who will be at a high risk of hemorrhage. As a matter of fact, no previous report has documented thrombotic complication in a patient with primary thrombocytopenia after arthroscopic ACL reconstruction. This study was, to our knowledge, the first to report such a case with the hope to enhance the awareness of venous thrombosis after arthroscopic ACL reconstruction even in the present rare occurrence.

Case report

A 48-year-old woman presented to our emergency room with pain and swelling in the left knee after a traffic accident. The initial clinical examination revealed hemarthrosis in the knee and a limited range of motion. The anterior drawer and Lachman tests were too painful to conduct and the valgus stress test was grade III positive with the knee in 30 degrees of flexion. Magnetic resonance imaging confirmed the tear of ACL and medial collateral ligament and the patient was hospitalized. The course of routine blood test results is shown in Table 1 and Figure 1. On the first day, the platelet count was 34000/mm^3. Hepatitis B surface antigen was positive. Color Doppler ultrasound showed the normal shape of the liver and spleen with the normal function in the laboratory tests. The immunologic markers including C3 and C4 complement, immunoglobulin, antibody were negative or in the normal level. Bone marrow puncture was nearly normal.

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Table 1. The routine blood test on the first day, the 12th (the operation day), 14th (the venous thrombosis day), 17th, 32nd (the discharge day), and hundredth days (the 3-months follow-up day).

	1	12	14	17	32	100
WBC (cells/mm^3)	7700	6650	10900	10400	7000	8210
RBC (cells/mm^3)	3560,000	4210,000	4340,000	4460,000	4340,000	4320,000
Hb (gr/dl)	7.2	9.8	10.3	10.8	10.9	10.6
Platelet (cells/mm^3)	34000	76000	86000	23000	3000	55000

WBC: White blood cells; RBC: Red blood cells; Hb: Hemoglobin.

On the 12th day after the transfusion of red blood cells and platelet (Fig. 1), arthroscopic single-bundle ACL reconstruction with hamstring autograft and mini-open suture repair for the medial collateral ligament was performed under spinal anesthesia (Fig. 2). The total tourniquet time was 90 minute and there was no complication during the surgery. Because of the potential hemorrhagic risk, a compressive bandage was applied for 48 hours after the surgery. Active ankle range of motion exercises was introduced after the surgery.

On the second post-operative day, the patient had pain and swelling in the left lower leg with a positive Hohmann's test. Duplex ultrasound revealed posterior tibial venous thrombosis (Fig. 3). Because of the primary thrombocytopenia and high risk of hemorrhage, low molecular weight heparin was not applied. The patient was treated with immobilization and rest for 2 weeks.

After two weeks of rest, gentle knee range of motion exercises were introduced and progressive weight bearing was allowed as tolerated with the assistance of a knee brace in full extension. Full mobilization was allowed six weeks after the operation. After 2-year follow-up, the patient returned to her usual daily activities without any complaint. The activation of protein C and protein S were recorded as 84.8% and 80.5%, lower than the normal level. Factor VIII was measured as 122.6%, higher than the normal people were. The active protein C resistance (APCR) was positive as 1.7.

Discussion

To the best of our knowledge, this is the first report that illustrates deep vein thrombosis in a patient with primary thrombocytopenia after arthroscopic ACL reconstruction.

Deep vein thrombosis is generally thought to occur rarely after knee arthroscopy. Arthroscopic ACL reconstruction is a more invasive procedure, with a potentially higher risk for deep vein thrombosis. However, no statistically significant difference was found between the incidence of venous thrombosis after ACL reconstruction and simple arthroscopic surgeries.[3]

Venous thrombosis is a major medical problem caused by both genetic and environmental factors. Delis et al. reported the risk factors for DVT after knee ar-

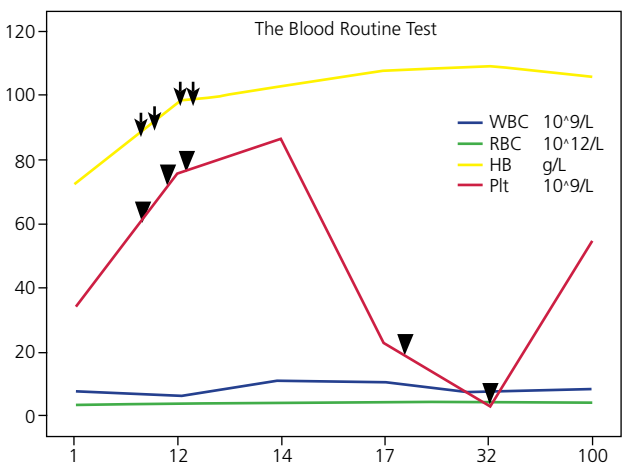

Fig. 1. The clinical course of the routine blood test. The patient received the transfusion of red blood cells (arrow, 2 U each time) and platelet (triangle, 10 U each time). [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

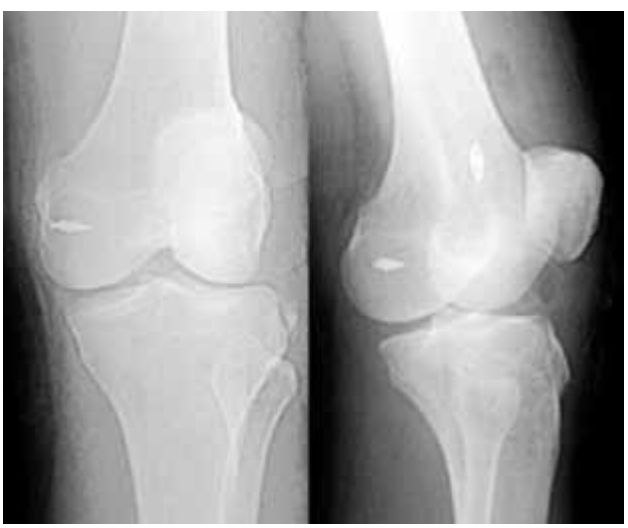

Fig. 2. The X-ray of the knee after arthroscopic single-bundle ACL reconstruction and mini-open suture repair for the medial collateral ligament.

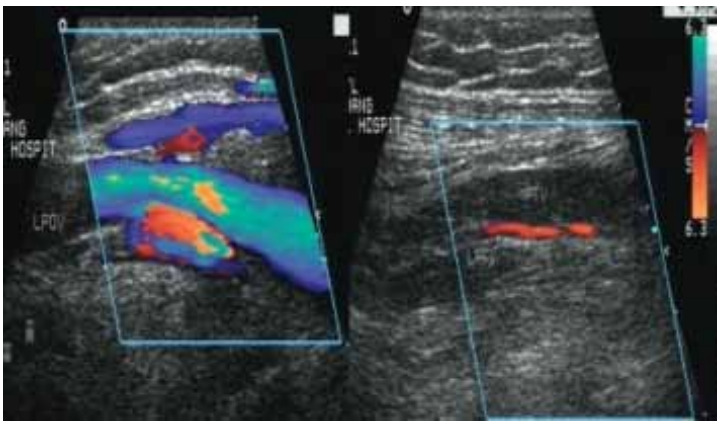

Fig. 3. The sign of posterior tibial venous thrombosis in Duplex ultrasound examination. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

throscopy as age above 65 years, obesity, smoking, female hormone intake, venous insufficiency, and previous history of venous thromboembolism.[4] None of these factors were identified in our case. The lower DVT risk in Asians was associated with the lower prevalence of genetic induced abnormalities such as active protein C resistance and factor V Leiden mutation.[5] In our patient there was increased activity of factor VIII and decrease in Protein C and Protein S activation.

Another etiological factor for the development of DVT is the effect of direct trauma. The incidence of traumatic DVT varies from 5 to 63% depending on patient's risk factors, methods of detection, modality of prophylaxis, and mechanism of injury, particularly head injuries and pelvic and lower extremity fractures.[6] Our patient had tear of the ACL and medial collateral ligament. The initial positive clinical findings were hemarthrosis and a limited range of motion in the knee. There was no pain and swelling in the left lower leg. However, the lack of the Duplex ultrasound examination before the operation may be a limitation of the present study.

Postoperative anticoagulants and antiaggregants are the routine methods for the prevention and treatment of DVT. However few studies analyzed the effectiveness of medical prophylaxis in the prevention of DVT after ACL reconstruction. With the low incidence of DVT, most researchers do not recommend routine thromboprophylaxis after ACL reconstruction.

A platelet count below 100,000, rather than 150,000 cells/mm^3 is required for the diagnosis of thrombocytopenia according to an international working group recommendation.[7,8] Thrombocytopenia may occur as a component of another clinically evident disorder, after drug exposure or in the absence of a clear predisposing etiology. For the present case, primary immune thrombocytopenia was the final consideration, which is a diagnosis of exclusion from both non-autoimmune and secondary causes. As the first-line therapy, the patient was treated with corticosteroids; the platelet was stably kept at a hemostatic but "not" necessarily a normal level.

The strength of present case was coexistence of the postoperative DVT and primary immune thrombocytopenia, lectures lacks on the related treatment experience. For the thrombocytopenia, the risk of bleeding is minimal when the platelet count is at 30000 cells/mm^3; below that level the bleeding risk increases progressively, and it is highest when the count is below 10000 cells/mm3, and moreover, the presence of other risk factors can increase the risk of hemorrhage such as platelet dysfunction, coagulation defects, postoperative anticoagulants and antiaggregants.[9,10] Based on security considerations, low molecular weight heparin was not routinely applied.

Fortunately, the venous thromboembolism did not have an influence on the final result of our patient. The present case would enhance our vigilance on deep vein thrombosis after arthroscopic ACL reconstruction, even in a special condition like primary thrombocytopenia.

Conflicts of Interest: No conflicts declared.

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